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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,663	12/04/2006	Shigenori Fujikawa	2870-0310PUS1	9919
2292 7590 06/11/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER SCHIFFMAN, BENJAMIN A				
ART UNIT		PAPER NUMBER		
1791				
NOTIFICATION DATE		DELIVERY MODE		
06/11/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

# Office Action Summary

**Application No.**

10/555,663

**Applicant(s)**

FUJIKAWA ET AL.

**Examiner**

BENJAMIN SCHIFFMAN

**Art Unit**

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-824)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 23 August 2007 and 4 November 2005.



**DETAILED ACTION**

1. The papers submitted 4 December 2006, amending claims 3, 4 and 6-9 are acknowledged.

***Election/Restrictions***

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-9, drawn to a method of producing a nanomaterial.

Group II, claim(s) 10-18, drawn to a nanomaterial.

3. The inventions listed as Groups I (claims 1, 3-9) and II (claims 10, 12-13, 15-18) do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups I (claims 1 and 3-9) and II (claims 10, 12-13, 15-18), each include the common technical features expressed in claims 1 and 10. However, these technical features do not constitute a special technical feature because they are not a contribution over the prior art. The Publication of J. Vac. Sci. Technology Vol. 18, 2000, p. 3505-3509, cited in the International Preliminary Report on Patentability dated 16 March 2006, discloses a method for producing a nanostructure wherein the mold is formed on solid substrate and titania film is formed on the mold as set forth in claims 1, 8-10 and 16-18.

4. The inventions listed as Groups I (claim 2) and II (claims 11 and 14) do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of Group I (claim 2) invention is a lithographic method and nanostructural bodies of metal oxide and organic/metal oxide composite claimed therein which is not present in Group II, claims 11 and 14. The special technical feature of the Group II (claim 11 and 14) invention is specifically claimed a portion of the film, a separated substrate, the mold and a structural body which is not present in Group I.

5. During a telephone conversation with Richard Dallagher, r.n. 28781 on May 27, 2009 a provisional election was made with traverse to prosecute the invention of Group I, claim 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-18 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

7. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise

require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

8. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

#### ***Foreign Priority***

9. Acknowledgment is made of applicant's claim for foreign priority based on two applications filed in Japan on 9 February 2004 and on 7 May 2003. It is noted,

however, that applicant has not filed a certified copy of the 2004-032280 and 2003-129347 applications as required by 35 U.S.C. 119(b).

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-3, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Cuisin et al. (*Fabrication of three-dimensional photonic structures with submicrometer resolution by x-ray lithography*).

12. Regarding claim 1, Cuisin discloses a method of forming a submicrometer, i.e. nanometer, material (**see abstract**) with the steps of forming a mold by a lithographic method on a substrate, in this case the mold is formed in a layer of PMMA deposited upon Si/SiC/W substrate (**see pp. 3506-7, section II**); forming a metal oxide on the PMMA layer, i.e. forming a organic/metal oxide composite layer; and finally removing the PMMA layer, to form a metal oxide submicrometer structure (**see p. 3508, section IV**).

13. Regarding claim 2, Cuisin discloses a method of forming a submicrometer, i.e. nanometer, material (**see abstract**) with the steps of forming a mold by a lithographic method on a substrate, in this case the mold is formed in a layer of tungsten deposited upon Si/SiC substrate; forming a polymeric thin film, i.e. the PMMA layer (**see pp. 3506-**

**7, section II);** forming a metal oxide on the PMMA layer; and finally removing the PMMA layer, to form a metal oxide submicrometer structure (**see p. 3508, section IV**).

14. Regarding claim 3, Cuisin discloses that the PMMA mold, i.e. the organic portion of the organic/metal oxide composite, is removed (**see pp. 3508, section IV**).

15. Regarding claim 8, Cuisin discloses that the mold is formed in PMMA, i.e. an organic compound (**see pp. 3506-7, section II**).

16. Regarding claim 9, Cuisin discloses that the mold of PMMA is removed by calcination, i.e. baking (**see p. 3508, section IV**).

### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of



the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

20. Claim 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cuisin et al. (*Fabrication of three-dimensional photonic structures with submicrometer resolution by x-ray lithography*) in view of Li et al. (*A High-Rate, High-Capacity, Nanostructured Sn-Based Anode Prepared Using Sol-Gel Template Synthesis*).

21. Cuisin discloses a method of forming nanostructure as described in the 102(b) rejections of claim 1 and 3 above.

22. Cuisin does not appear to explicitly disclose a step of removing the substrate from the mold/organic portion of the organic/metal oxide composite.

23. However, Li discloses a method of making nanostructures (**see abstract**) with the step of removing the metal oxide nanostructure from the substrate (**see p. A165 col. 1**).

24. At the time of invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method of Cuisin to include the substrate removal step of Li, in order to inspect the formed nanostructure with a TEM (**see p. A165 col. 1**).

25. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cuisin et al. (*Fabrication of three-dimensional photonic structures with submicrometer resolution by x-ray lithography*) in view of Kenausis et al. (*Poly(L-lysine)-g-Poly(ethylene glycol) Layers on Metal Oxide Surfaces: Attachment Mechanism and Effects of Polymer Architecture on Resistance to Protein Adsorption*).
26. Cuisin discloses a method of producing a nanostructure as discussed in the above 102(b) rejection of claim 1.
27. Cuisin does not appear to expressly disclose covering at least a portion of nanostructure, or the mold/organic portion.
28. However, Kenausis discloses a polymer coating for a metal oxide surface (**see abstract**).
29. At the time of invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method of Cuisin to include the coating of Kenausis, in order to convert the oxide from a strongly interactive surface to a noninteractive surface in applications such as biomaterials (**see abstract**).
30. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cuisin et al. (*Fabrication of three-dimensional photonic structures with submicrometer resolution by x-ray lithography*) in view of Fujikawa et al. (*Surface Fabrication of Interconnected Hollow Spheres of nm-Thick Titania Shell*).
31. Cuisin discloses a method of producing a nanostructure as discussed in the above 102(b) rejection of claim 1.

32. Cuisin does not appear to explicitly disclose that the oxide film is formed by bringing a metal compound capable of reaction with hydroxyl or carboxyl groups present into contact with a forming surface and hydrolyzing the metal compound to obtain the oxide. Although Cuisin does describe that the oxide is formed by a sol-gel process, which is a process of bringing a liquid precursor containing a metal compound into contact with a surface and hydrolyzing the metal compound to form a metal oxide.

33. However, Fujikawa discloses a method of forming a nanostructure (**see title**) wherein oxide thin film is formed on latex beads forming an organic/metal oxide film the latex having a carboxylated surface and the titania film is formed on the latex surface through a sol-gel process (**see p. 1134**).

34. At the time of invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method of Cuisin to include the latex with a carboxylated surface of Fujikawa, because this is a known technique of applying metal oxide thin films to which would obtain predictable results.

### ***Conclusion***

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENJAMIN SCHIFFMAN whose telephone number is (571)270-7626. The examiner can normally be reached on Monday through Thursday from 9AM until 4PM.

36. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, CHRISTINA JOHNSON can be reached on 571-272-1176. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

37. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BENJAMIN SCHIFFMAN/

Examiner, Art Unit 1791

/Christina Johnson/

Supervisory Patent Examiner, Art Unit 1791